

REMARKS

Re-examination and favorable reconsideration in light of the above amendments and the following comments are respectfully requested.

Claims 1 - 48 are pending in the application. Currently, no claim has been allowed.

By the present amendment, claim 1 has been amended to include the subject matter of claim 6; claim 28 has been placed into independent form; claim 34 has been amended to include the subject matter of claim 35; and claim 41 has been amended to include the subject matter of claim 42. Further, claims 7, 8, 15, 20, 36, 38, and 39 have been amended to change their claim dependency.

In the office action mailed on August 17, 2004, claims 1 - 41 were rejected under 35 U.S.C. 112, first paragraph; and claims 1 - 5, 34, and 41 were rejected under 35 U.S.C. 102(b) as being anticipated by the article to Michalewicz et al.

The foregoing rejections are traversed by the instant response.

With regard to the rejection on anticipation grounds over the Michalewicz article, the rejection has been mooted by the amendments to independent claims 1, 34, and 41. Each of these

claims now includes subject matter from a dependent claim which was not rejected on anticipation grounds.

The sole remaining rejection is the rejection under 35 U.S.C. 112, first paragraph. The Examiner in paragraph 5 states that the claims recite the intention of developing a predictive model. The Examiner goes on to aver that the details involving how one steps from the chromosomes to a fully descriptive model are not identified in an integrated manner and such step is not trivial. While the Examiner goes on to conclude that one of ordinary skill in the art could replicate the invention without undue experimentation, the Examiner has not made out a prima facie case of non-enablement. In particular, the Examiner has not indicated why one of ordinary skill in the art having the step by step teachings contained in the specification and drawings could not make and use the claimed invention, particularly the claimed method and the claimed system. As stated in *In re Armbruster*, 185 USPQ 152, 153 (CCPA 1975), quoting from *In re Marzocchi*, 169 USPQ 367, 369-70 (CCPA 1971), "it is incumbent upon the Patent Office, whenever a rejection on this basis [lack of enablement] is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested

statement. Here, the Examiner has not put into the record any evidence or reasoning as to why one could not perform the claimed method and/or use the claimed system. Similarly, the Examiner has not provided any reason why one could not make and/or use the chromosome which is set out in claims 41 and 43 - 48. In Applicant's opinion, the specification contains sufficient guidance so that one of ordinary skill in the art could make and use the claimed invention without undue experimentation. Even if some considerable experimentation were needed, and Applicants believe none is needed, such experimentation would be permissible. See *Ex parte Jackson*, 217 USPQ 804, 807 (BPAI 1982); also see *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 81, 94 (Fed. Cir. 1986). Where a specification, such as the instant one, provides guidance in selecting parameters that would yield the claimed result as well as a lot of other details, it is fair to conclude that the experimentation required to make a particular embodiment is not "undue". See *In re Colianni*, 195 USPQ 150, 153 (CCPA 1977); also see *In re Wands*, 8 USPQ2d 1400, 1406 (Fed. Cir. 1988).

One point which the Examiner does not seem to understand is that the digital chromosomes directly become an equation when the zeros and ones of binary are transformed into base 10

numbers. This transformation of binary to base 10 is the basis of all modern digital computer technology and is therefore trivial. Segment boundaries as depicted in figures 1 and 5 define the start and end points of specific terms in the equation (e.g. signs and coefficients, inclusion and exclusion factors, outlier trimming parameters, etc. The chromosome is the equation written in binary code. Note that figure 3 in the application shows an example of binary to base 10 conversion.

In paragraph 11 of the office action, the Examiner responds to certain comments made in Applicants' previous amendment.

Applicants' response is as follows:

1. **Re difference between variable segments and interaction segments : These are not synonymous. A variable segment deals with only one predictive variable. It contains fields for the optimization of variable selection, outlier trimming , coefficient determination and transformation. In contrast, an interaction segment contains two variables, the mathematical interaction between them (e.g., multiplication, division, difference squared, or absolute difference) and a coefficient. Transformation genes do not allow for outlier trimming or other transformations beyond those carried out in the interaction of the two basic variables. Both variable segments and interaction segments are types of genes.**
2. **Characteristics for continuity of a variable- Variables are determined to be continuous or categorical based upon the number of unique values that the variable displays as it is read into the analytic data set. The user has the ability to over-ride default settings for minimum unique values constituting a continuous variable.**
3. **Boolean selection logic continuous? It is continuous if the variable is allowed in the equation. The majority of variable are likely to be inactive in any given predictive equation. However if the include/exclude gene is turned on then a variable with a continuous characteristic will receive a coefficient that allows the estimation of a predicted value for all possible input values.**
4. **How does one set the maximum for an outlier gene? How are minimums handled? The value for trimming on the maximum side is arrived at just as the coefficients, and many other terms active in the equation. This is the process of estimation, testing, crossover and mutation inherent in the genetic algorithm process. Both minimum cutoffs and maximum cutoff values are imbedded in each outlier trimming segment.**
5. **"Some number of bits represent the exponent to use in the power transformation." Some number of bits map to a table index that tells the equation what the power transformation is. That table offers many possible transformation powers.**

6. Page 4 table This table simply illustrates how transformation powers are determined. Specifically, the binary is transformed into decimal. It is then divided by 8 then multiplied by 4 (divides by 8 because in this case it is the total number of values than can be represented by the 3 bits) (four represents the exponent range desired) and then subtract 2 to get then transformation (subtracting half the range to get negative and positive). In the case of binary 100, since the above formula would yield a constant vector of 1, this binary 100 value was assigned the value of the log (x).
7. Outlier trimming on minimum side see answer #4
8. How is log (x) applied to a negative number? The absolute value is taken prior to the log transformation.
9. Line 9 = 8 bits line 10 shows 7 bits Line 10 is a typo, it should show 8 bits as well.
10. Determining Min from max see answer #4
11. Number of bits lines 19-23 page 4 The example is correct the addition in the description is wrong. One bit on off gene, 8 bits outliers (4 max 4 min), 8 bits coefficient, 3 bit transformation = $1+8+8+3=20$.
12. Description vs example bit difference. See answer #11
13. What is the coding order of the bits? The coding order is as described on page 4 lines 19-23. The first set of 20 bits represent variable #1, the second set of 20 bits represent variable #2 and the last 20 bits reading from left to right represent variable #3. Together the 60 bit chromosome represents the on/off, outlier trimming, transformations, and coefficients for all three variables. Reading of each variable is: 1st bit = on/off, 2nd through 5th bits = minimum outlier, 6th through 9th bits = maximum outlier, 10th-12th bits = transformation, 13th-20th = coefficient.
14. What is the determining factor for exclusion of a variable, why aren't excluded variables shorter? Variables are included or excluded through the genetic algorithm process that rewards models with higher predictive powers. Thus if a model is created in the iterative process and it has Var #1 turned on (active in the model) and if that model is tested and demonstrates superior predictive power, the Var #1 active flag is more likely to be in the final solution (i.e., be still turned on at the end of the iterative process). Chromosomes do not change size based upon the number of active variables in the model because this is a dynamic process and a variable that is off in one generation may be turned on in the next. Therefore it is necessary to leave the chromosome at a fixed length to allow for continued testing of alternative solutions.
15. Page 5 lines 1-15 rational behind setting of trim values. Trim values are arrived at through the optimization process inherent in genetic algorithms. Trimming either too aggressively or insufficiently will yield inferior predictions and will therefore be discarded by the process in favor of more optimal trim values. Variable selection, outlier trimming, transformation selection, and coefficient determination are all simultaneously optimized through the genetic algorithm process.
16. Process does not formulate closure on a unique solution and therefore a process of indefiniteness. There are for all purposes an infinite number of possible predictive models given a large number of input variables. Given the impossibility of examining all possible models, no modeling process can be certain to generate the best model. Like processes that involve quantum physics or processes that include Monte Carlo simulations, there is a degree of uncertainty as to the final product. It is a process to identify very good predictive models as optimal predictive models are impossible to achieve. Genetic algorithm results are replicable however if the computer clock that is used to generate the random number process is reset to the same start value.

17. Why is the model in this form? **This form of model is judged to be the most commercially attractive.**

18. Page 7 line 6 "Op" **Op stands for operation, i.e., what operation is to be performed on the two variables (Variable 0011 and variable 0101). The operation action is defined in a look up table that includes multiplication, division, absolute difference, addition, subtraction, and absolute difference squared. Additional transformations can be defined by the user and added to this table without altering the structure of the chromosome.**

In light of the foregoing, the Examiner is hereby requested to withdraw the rejection under 35 U.S.C. 112, first paragraph.

The instant application is believed to be allowable for the foregoing reasons. Such allowance is respectfully solicited.

Entry of the instant amendment is believed to be in order since it does not raise any new issue which requires further search and/or consideration by the Examiner. Further, it does not raise any issue of new matter. Still further, it does reduce the issues on appeal.

Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, the Examiner is hereby invited to contact Applicants' attorney at the telephone number listed below.

A notice of appeal is enclosed herewith.

A check in the amount of \$214.00 is enclosed herewith to cover the fee for the extra independent claim and the fee for the notice of appeal. Should the Commissioner determine that an

additional fee is due, he is hereby authorized to charge said
fee to Deposit Account No. 02-0184.

Respectfully submitted,

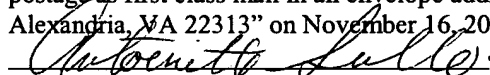
Matthias Kehder et al.

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on November 16, 2004


Antoinette Sullo